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for class use in colleges, it is equally serviceable as a handbook for the working geologist. The volume is divided into three parts. The first considers the methods of study and the chemical character of the earth's crust; the second is devoted to a description and determination of the rock making minerals and the third and larger portion to description and determination of the chief rocks. As is to be expected, more than half of the latter portion is given over to the igneous rocks.

Numerous well-chosen and clearly printed half-tones devoted to rock structure and appearance add much to the value of the work, and an excellent index makes the volume readily usable as a handbook. The general form of presentation shows that the pupil needs a good foundation in general chemistry in order to take up petrology. With such a foundation any beginner could readily proceed far in the study and classification of rocks with such a convenient and inclusive handbook.

The author does not content himself with merely presenting the features of laboratory specimens of the various rocks, but considers their field appearances as well. For instance, under the heading "Occurrence of Igneous Rocks," we find the following subheads which will show the method followed by the author: Intrusive Modes of Occurrence—Dikes, Intrusive Sheets, Laccoliths, Necks, Stocks, Bathyliths; Extrusive Igneous Rocks—Quiet Eruption, Lava Flows, Explosive Eruptions, Tuffs and Breccias. A similar method is followed in the other divisions.

The book is satisfying because of its thoroughness, simplicity and practical character and should prove a valuable aid to beginning students in general geology as well as for those who are to devote themselves to aspects of applied geology.

R. E. D.

Artificial Waterways and Commercial Development. By A. Barton Hepburn. ix and 115 pp. The Macmillan Company, New York, 1909. Price, $1.00.

This small volume, which may be easily read at a sitting, emphasizes the importance of waterways as a supplement to the vastly developed railway system of the United States. More directly, it is a brief for an effective waterway across the State of New York, to promote and maintain the commercial supremacy of New York City. The foundation for the argument is broadly laid by an opening chapter on the canals of other lands. The canal system of New York is reviewed, with an account of its beginnings, its progress and its present condition. The familiar story of the inception of the Erie Canal is well told, followed by a notice of cost, traffic, tolls and revenue, with the history of such enlargements as have been undertaken. Emphatic expression is given to the neglect of the past forty years. This neglect has been due to the blindness of the people and to the hostility of the railroads, which have sought to throttle the canals, both to kill competition and to ward off the burden to which, as part owners and taxpayers, they were subject. Political corruption and misappropriation of funds by a powerful canal ring have also played their part. The squandering of $9,000,000 in the abortive project of 1895 is properly characterized, and a hopeful view is taken of the present undertaking for deepening and enlargement.

A vigorous section exhibits the competition against the City of New York, by which her commerce is transferred to competing ports within and without our own boundaries. The New York Central Railroad is not devoted to the metropolis, for it derives equal advantage in freighting to Boston. Differential rates designed to equalize advantages, serve in reality as a handicap to New York. Freight cannot, as at other ports, be delivered on the deck of trans-Atlantic vessels, and thus lighterage charges must be borne, and added to this are inadequate dock facilities. Canadian foresight and liberal expenditure have resulted in strong competition by Dominion ports, and the long planned Georgian Bay route will yet more surely deprive American centres of trade which legitimately belongs to them. These arguments are not new, but they are here presented with convenient brevity and telling simplicity. The same qualities belong to the sections on the Panama Canal and on the relation of navigation to conservation problems. At the end are tabular summaries relating to New York canals, the commerce of New York City, the commerce of the Great Lakes and Canadian canals, and giving data concerning the Panama Canal. A. P. B.

The Interpretation of Topographic Maps. By Rollin D. Salisbury and Wallace W. Atwood. 84 pp., 170 Maps and Half-tone Plates, 34 Figures in the Text and Index. Professional Paper 60, U. S. Geological Survey, Washington, D. C., 1908.

It is a hopeful sign in American Geography that the value of good maps is beginning to be recognized. Professors Salisbury and Atwood have done a work of peculiar value to geographers and to teachers of Geography in the preparation of this paper. The symbolism of the topographic map is fully explained, in connection with the legend, and in the first fifteen plates are assembled illustrations of the chief general kinds of topography, with short but adequate exposition of the method of exhibiting relief. Thus the same area, a small section of coastal lowland along the Potomac River, is shown, (a) with contours only, (b) with drainage only, (c) with contours and drainage combined, (d) with contours, drainage and culture in the complete map. Mountains and plains follow, with varying expression due to different scales and contour intervals employed for the same areas. In some cases a map is placed beside a sketch or photograph of the same or of a similar region. The map of Mt. Shasta, for example, is conjoined with a perspective view of the great cone. In like manner, a morainic area in New Jersey, with its ponds, swamps and dry depressions, is put in comparison with a view of the morainic hills of a neighbouring region. Plate 13 puts together a flat coastal area on Delaware Bay and a rugged shore-line district of California. The next plate shows corresponding shore-line types in photograph, one from Arctic lands and the other from Oregon. The text often interprets the relation of cultural features such as roads and settlements to the forms of the land.

It is known to physiographers that aeolian topography is expressively delineated on many atlas sheets, representing parts of the Atlantic Coast and of the Great Plains. It is not, however, commonly understood that the fleeting winds leave records so capable of graphic representations. The plates of group 2, seven in number, show this type of land form, examples being given from the shores of Chesapeake Bay and of Lake Michigan, and from the plains of Kansas and Nebraska. Any alert instructor would perceive the educational usefulness of the photograph (Pl. 20) of an incipient dune at South Chicago.

Group 3 offers one of the fullest and most important series of maps in the volume, since it represents in wide range the forms due to stream erosion. This part of physiography is widely recognized as of peculiar value in teaching, because illustrations of the type can be found and utilized in the field of all